

REMARKS

Reconsideration of the application, in view of the above amendments and the following remarks is respectfully requested.

The examiner objects to Claim 7 because of the recitation of the fourth semiconductor region is of the first electroconductive type. Claim 7 has been corrected herewith.

The examiner rejects Claims 1-3 under 35 U.S.C. 103(a) as being unpatentable over Pan. The examiner states that Pan shows a solid-state imaging device which has, inter alia, a second semiconductor region (50) of the first electroconductive type formed deeper than said first region (55) in the outer layer (43) and said light-receiving portion.

This rejection is respectfully traversed. Pan describes Figs. 3 and 4 in column, 3 lines 14-34. In that paragraph, layer 50 is described in several places as a LDD layer. As well known to those skilled in the art, this means that it is a laterally diffused diffusion which is not the vertical transistor as described in Claim 1. This is important because the signal photoelectron is sensed by the vertical junction transistor whereas in Pan, the sensing current flows in a lateral, not vertical, direction. In Fig. 4 of Pan, for example, signal charges (holes) will accumulate in the P-part 43. Part of the signal electrons are also accumulated in the surface N-type region 55 and can modulate the threshold of the junction transistor. The channel potential cannot be sensed in this junction transistor because there is no source/drain structure in Fig. 4. If a source /drain structure was introduced into the structure shown in Fig. 4, the sensing current would also destruct the signal charge (holes) in the photodiode so that the structure would not work as a signal sensing transistor. It should also be noted that the reset transistor 48 is not a buried channel NMOS transistor, but a surface channel NMOS transistor. Accordingly, the examiner's rejection should be withdrawn.

The examiner rejects Claim 4 under 35 U.S.C. 103(a) as being unpatentable over Pan in view of Guidash. The examiner rejects Claim 5 under 35 U.S.C. 103(a) as being unpatentable over Pan and Guidash and further in view of Joo. The examiner rejects Claim 6 under 35 U.S.C. 103(a) as being unpatentable over Pan, Guidash, and Joo and further in view of Kopley. The examiner rejects Claims 7, 11, and 12 under 35 U.S.C. 103(a) in view of Hashimoto. The examiner rejects Claims 8, 13-15 and 18 under 35 U.S.C. 103(a) as being unpatentable over Pan, Guidash, and Hashimoto and further in view of Ikeda.

These rejections are respectfully traversed. In view of the inapplicability of Pan to the present invention, and the fact that the claims are clearly distinguished thereover, the claims are clearly distinguished over these combinations of references as well. Accordingly, these claims are patentable for the same reasons described above in connection with Claims 1-3.

Accordingly, Applicants believe that the application, as amended, is in condition for allowance, and such action is respectfully requested.

Respectfully submitted,
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